

## ABSTRACT

An apparatus for mixing small volumes of liquids using a submerged permanent magnet impeller and a programmable electromagnet driver with variable frequency and magnetic field strength and field gradient. These variables and the duration of their application are controllable by a computer programmed with specific algorithms. The electromagnet driver has no moving mechanical parts. In a typical embodiment a small permanent magnet impeller is submerged in a solution to be mixed while contained in, say, a 1.5 mL Eppendorf conical tube or in a well of a multiwell plate. The tube or well to be mixed is placed above and in close proximity to the electromagnet driver. An operator inputs the frequency, field, gradient, and duration using a graphical user interface. The magnetic field applied to the impeller magnet via the driver electromagnet causes the impeller to undergo rapid motion in all planes thereby transferring momentum vertically in the solution.

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